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CASE REPORT

A Giant Bladder Stone With Bilateral Hydronephrosis in a Young Male

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We report a 35-year-old man with bilateral hydronephrosis found during a routine health examination. Kidney-ureter-bladder scout film showed a huge, oviform pelvic calculus (6.2 × 5.1 cm), and the calculus was treated endoscopically by electrohydraulic lithotripsy with excellent results. Bladder stones are a common problem, but it is rare for a calculus to be large enough to cause bilateral hydronephrosis in a young male. Surgical intervention by either cystolithotomy or endoscopic cystolithotripsy can achieve satisfactory results. Close follow-up is mandatory, because the recurrence of urolithiasis is high in those patients with voiding problems and there is also recurrent urinary infection. This case report illustrates the importance of sonographic evaluation of patients with bilateral hydronephrosis for the diagnosis of bladder calculi.

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1. Introduction

Urinary lithiasis is a common medical condition that has been documented for centuries. The first bladder stone was discovered in a boy in Egypt in approximately 4800 BC.[1] During the 19th century in Europe, vesical stones were mostly diagnosed in children. Following the industrial revolution, improved nutrient and antimicrobial therapy were developed, and therefore, the incidence of bladder lithiasis in pediatrics was nearly eliminated in the Western world. However, in underdeveloped counties, children still suffer from endemic bladder calculi.

Bladder calculi account for 5% of all urinary stones in the Western world.[2] They usually occur because of foreign bodies, obstructions or infections. The average age of patients with bladder calculi is 41 years old as reported by Hammad et al.[3] Men with urethral stricture, prostate disease or bladder disease (bladder diverticulum and neurogenic bladder) are high-risk groups. The majority of bladder calculi occur in women, and they are secondary to anti-incontinence surgery.

Traditionally, treatment of huge vesical calculi (>4 cm) has been carried out via open surgery.[1] However, we report a huge bladder stone in a young male who was treated with electrohydraulic lithotripsy (EHL) with excellent results.

2. Case Report

A 35-year-old man presented to the urology outpatient department with bilateral hydronephrosis after a routine health examination was carried out. He had urinary frequency, nocturia and urinary intermittency for several years without any medication or medical consultation, and he also denied having gross hematuria or difficult

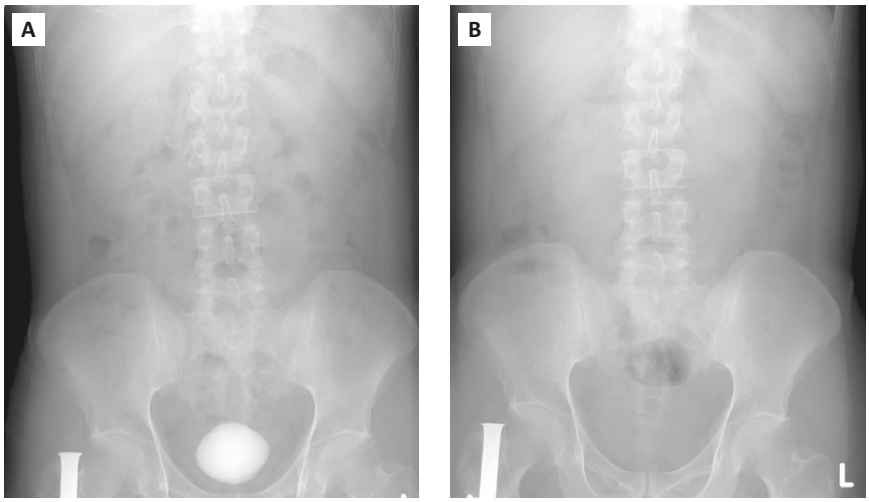

Figure 1 A plain X-ray. (A) A giant pelvic stone is shown. (B) No bladder stones were observed 2 months later.

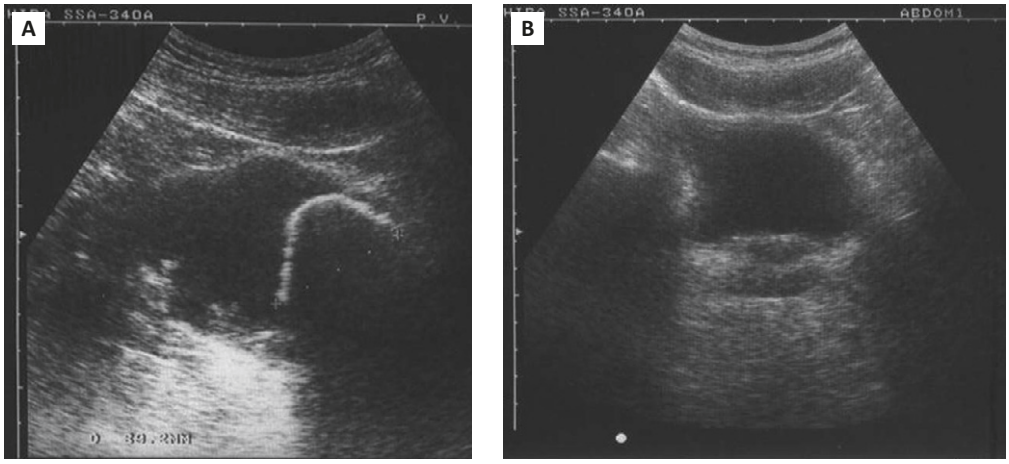

Figure 2 (A) Bladder ultrasound shows a calculus in the urinary bladder. (B) No bladder stones were observed 2 months later in an ultrasound follow-up.

voiding. In his physical examination, no flank knocking pain was found. Digital rectal examination disclosed a normal sized prostate with no local tenderness or local heat, and his urinalysis revealed microscopic hematuria, pyuria and crystalluria (red blood cells, 5–10 per high-power field; white blood cells, >100 per high-power field). Laboratory examination showed that urea nitrogen and serum creatinine levels were 13 mg/dL and 1.2 mg/dL, respectively. Urine culture demonstrated group B β-streptococcus, and broad-spectrum parenteral antibiotics were given according to culture sensitivity. The kidney-ureter-bladder film revealed a huge pelvic calculus (Figure 1A), while renal ultrasound showed bilateral moderate hydronephrosis without renal stones. Bladder ultrasound disclosed a 6.2×5.1 cm calculus in the urinary bladder (Figure 2A) and a thickened bladder wall with little residual urine. A large bladder stone resulted in bilateral hydronephrosis and obstructive uropathy, and a urinary tract infection was diagnosed. After the urinary tract infection was controlled, the patient was moved to the urology ward for a cystolithotripsy (Figure 3A). The operation procedure went smoothly, and bladder stone fragments (Figure 3B) were easily delivered; no urethral stricture was found afterwards. Stone analysis showed that it was mainly composed of calcium oxalate, and urine cytology revealed no malignant cells. When renal ultrasound was rechecked, bilateral hydronephrosis had resolved and there were no bladder stones (Figure 2B). The kidney-ureter-bladder film was rechecked, and it showed no bladder stones 1 month later in the outpatient clinic (Figure 1B). The follow-up uroflowmetry showed that the maximum flow rate was 23 mL/s with no obvious residual urine.

3. Discussion

Bladder stones account for 5% of all urinary stones in the Western world.[2] They may be single or multiple, small, or large enough to occupy the entire bladder. The stone shape in our patient was ovoid, similar to pebble stones. The content of his bladder stone was mainly calcium

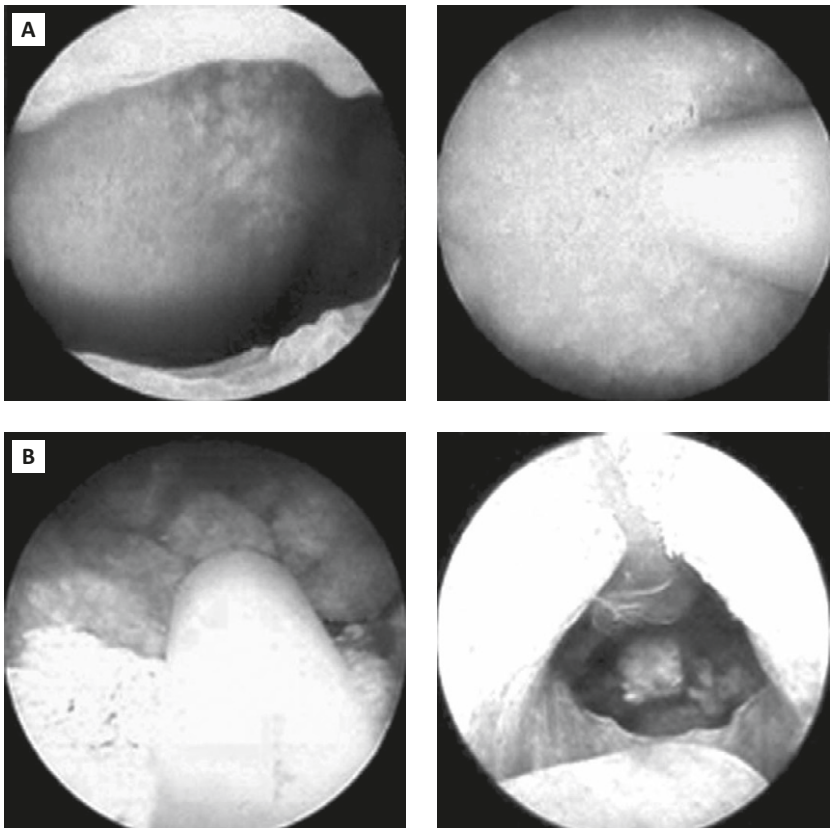

Figure 3 Cystoscopic view. (A) The bladder stone during the perioperative period. (B) Bladder stone fragment.

oxalate, which is different from the uric acid composition commonly found in older men.

Bladder stone is a common disease. The clinical presentation of bladder calculi depends on the size and location of the stone. The typical symptoms and signs may include dysuria, suprapubic pain, terminal gross hematuria, intermittency, and urine retention.[3] It is rare for a calculus to be so large that it causes bilateral hydronephrosis in a young patient, as in our case.

The usual indications for managing bladder stones include recurrent infection, urinary retention, gross hematuria, suprapubic pain, and lower urinary tract symptoms. Management of the stones depends on the patients' age and their general health, as well as the size, number and the density of the stones. Methods of treatment include medical therapy, shock wave lithotripsy, endoscopic cystolithotripsy, and cystolithotomy. Medical treatment options are limited in bladder stones because of the different types of lithotripsy already in use. The success rate from shock wave lithotripsy ranges from 72% to 100% with a variety of different lithotripsy;[4] however, shock wave lithotripsy should be reserved for high-risk patients.

Endoscopic cystolithotripsy can be used to treat bladder calculi by stone fragmentation using a variety of methods including litholopaxy, mechanical lithotripsy, ultrasound and EHL, and laser lithotripsy. Razvi et al.[5] compared the efficacy of manual lithotripsy, ultrasonic lithotripsy, EHL, and Swiss Lithoclast devices in 53, 17, 16, and 20 patients, respectively. The respective success rates were 90%, 10%, 88% and 2.5%, while the complication rates were 63%, 8%, 85% and 10%, respectively.

In adults, open surgery should be strongly considered for large stones (>4 cm) if lithotripsy has failed.[1] Open surgery results in 100% stone removal; however, our patient chose to be treated with EHL for the huge bladder stone (6.2×5.1 cm), because open surgery requires a longer hospital stay (5.2 days). Although EHL may be associated with higher rates of bladder mucosal injury and bleeding, it is very effective for hard stones. Removal of the Foley catheter was carried out on postoperative day 1 because of urine clearance, and the patient was then discharged on postoperative day 2.

Hammad et al.[3] reported the average age of patients with bladder calculi as 41 years. In comparison, the average age has been reported >50 years by both Douenias et al.[6] and Takasaki et al.[7] However, our patient with a giant bladder stone was only 35 years old. The patient's history showed that he took Chinese traditional herbs for a bone fracture for several years, but the etiology for the huge bladder stone remains unknown. The patient had neither renal colic history nor renal stones as shown by imaging studies. Therefore, bladder stone formation was likely due to a gradual increase in size. Further investigations into the etiology of bladder calculi or its risk for bladder cancer are necessary to improve preventative strategies.

In conclusion, we have presented a giant bladder calculus and the use of EHL, which showed promising results. In addition, a young age with bilateral hydronephrosis appears to increase the probability for bladder calculi. Moreover, Chinese traditional herb use may have been a risk factor for our patient, and further research is needed to address this issue.

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